

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

**EP 0 694 436 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
31.01.1996 Bulletin 1996/05

(51) Int Cl.<sup>6</sup> **B60N 2/28**

(21) Application number: 95830310.9

(22) Date of filing: 18.07.1995

(84) Designated Contracting States:  
DE FR GB IT SE

(72) Inventor: **Marinelli, Francesco**  
I-10060 San Secondo di Pinerolo (Torino) (IT)

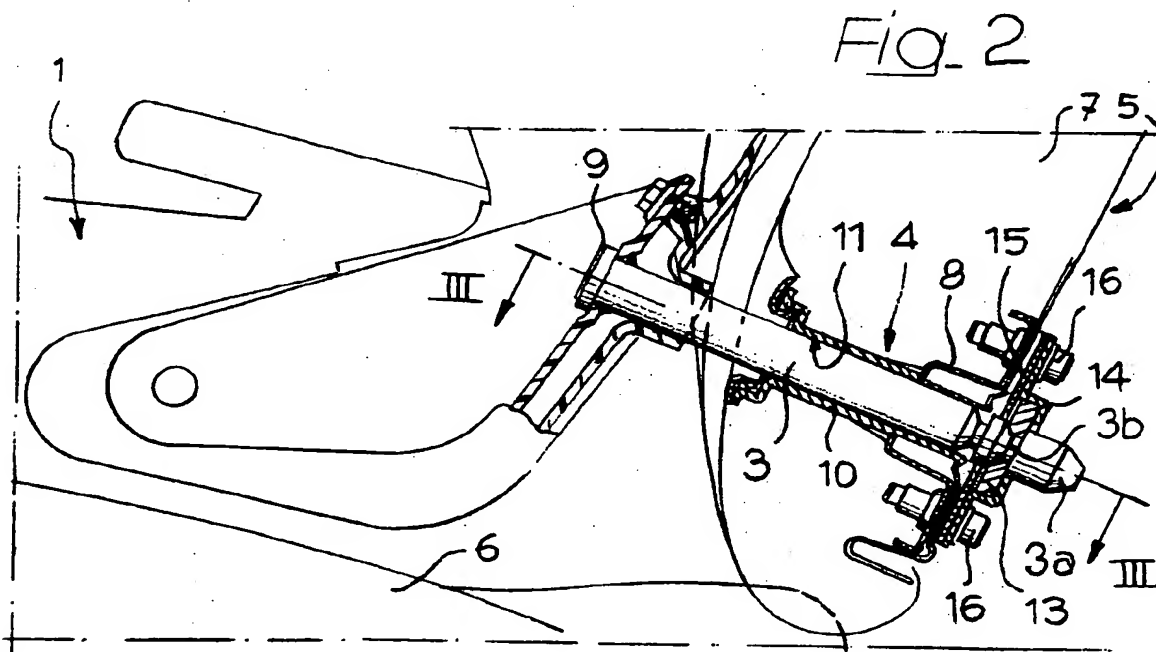
(30) Priority: 26.07.1994 IT TO940617

(74) Representative: **Notaro, Giancarlo et al**  
I-10133 Torino (IT)

(71) Applicant: **LEAR SEATING ITALIA S.p.A.**  
I-10128 Torino (IT)

(54) **Device for quick coupling of a child seat to a motor-vehicle seat**

(57) The device comprises at least two quick couplings each including a receiver element (4) and an engagement element (3) for engaging the receiver element (4), both carried respectively by the child seat (1) and the frame (8) of the backrest (7) of the motor-vehicle seat (5) or vice versa. There are further provided releasable locking means, for locking each engagement element (3) in its respective receiver element (4).



EP 0 694 436 A1

## Description

The present invention relates to a device for quick coupling of a child seat to a motor-vehicle seat.

According to the conventional art, child seats are secured to the body of the motor-vehicle with the aid of belts. This solution is unsatisfactory both from the standpoint of safety, and from the standpoint of convenience of use. As a matter of fact, in case of an impact of the luggage stored within the rear luggage compartment of the motor-vehicle against the backrest of the rear seat, as a result of a front collision of the motor-vehicle, this backrest is subject to a forward movement, with resulting danger for the occupant of the child seat, which is instead secured directly to the body of the motor-vehicle and therefore tends to oppose to said movement of the backrest. The use of belts for securing the child seat renders also the operations necessary for connecting the child seat to the motor-vehicle seat time-consuming and complicated.

Proposals have been made already for a quick-coupling arrangement for a child seat (see FR-A-2 680 734, DE-U-92 08 438) which however are all quite complicated and costly.

The object of the present invention is that of overcoming said drawbacks, by providing a device which enables a child seat to be connected rapidly directly to a motor-vehicle seat, with a simple, reliable and unexpensive structure.

In view of achieving this object, the invention provides a connecting device, characterized in that it comprises at least two quick couplings each comprising a receiver element and an engagement element engaging the receiver element, respectively carried by the child seat and the backrest frame of the motor-vehicle seat, or *vice versa*, and releasable locking means for locking each engagement element within the respective receiver element.

An important difference of the invention over the Prior Art lies in that the quick-coupling means are provided to connect the child seat to the frame of the backrest of the adult seat. This assures a simple and reliable arrangement. No solution of the Prior Art uses the backrest of the adult seat to support the child seat.

In a first embodiment, each engagement element is comprised of a bolt projecting rearwardly from the backrest of the child seat and said receiver element is comprised of a bush mounted within a hole formed through the backrest of the motor-vehicle seat; the locking means are comprised of a latch slidable within said backrest frame in a direction transverse to the axis of the bolt, said latch being biased by spring means towards a position locking said bolt and being manually moveable, against the action of the spring means, towards a position for release of the bolt.

In a second embodiment, each engagement element is comprised of a bolt projecting forwardly from the backrest of the motor-vehicle seat, and said receiver el-

ement is comprised of a hole formed through the backrest of the child seat; said locking means is comprised of a latch which is slidable within the backrest of the child seat in a direction transverse to the axis of said hole and is biased by spring means towards a position for locking said bolt and is manually moveable, against the action of the spring means, towards a position for release of this bolt. In this embodiment, each bolt has an articulated end portion, which is moveable to a position rotated by 90° with respect to the axis of the bolt for being received within a cooperating seat formed in the front face of the backrest of the motor-vehicle seat, when the child seat is not connected to this backrest. Thus, when the child seat is not used, the connecting bolts do not project from the backrest and do not cause therefore any disturb to the passengers.

In a further embodiment, each quick coupling is a coupling of the type known *per se* used for safety belts, wherein the engagement element is a tab and the receiver element is a buckle for safety belts. In a first variant, the buckle projects rearwardly from the child seat and the tab is fixed to the backrest frame of the motor-vehicle seat and projects forwardly from a hole formed through the backrest. In a second variant, the buckle is arranged at the rear of the child-seat with its receiving aperture facing downwardly, and the tab is fixed to the backrest frame of the motor-vehicle seat and projects forwardly from the gap between the cushion and the backrest of the motor-vehicle seat and has an end portion directed upwardly.

Due to these features, the invention enables an easy and quick connection of the child seat, while providing a connection directly to the structure of the motor-vehicle seat, with resulting advantages also from the standpoint of safety.

Further features and advantages of the invention will become apparent from the following description with reference to the annexed drawings given purely by way of non limiting example, in which:

- figure 1 is a perspective view of a child seat according to a first embodiment of the device according to the invention,
- figure 2 is a cross-sectional view at an enlarged scale of the device associated with the child seat of figure 1,
- figure 3 is a cross-sectional view along line III-III of figure 2,
- figure 4 is a cross-sectional view taken along line IV-IV of figure 3,
- figure 5 shows a variant of figure 2,
- figure 6 is a cross-sectional view taken along line VI-VI of figure 5,

- figure 7 is a cross-sectional view taken along line VII-VII of figure 6,
- figure 8 is a cross-sectional view taken along line VIII-VIII of figure 6,
- figure 9 shows a further variant of figure 2,
- figure 10 shows a cross-sectional view taken along line X-X of figure 9,
- figure 11 shows a further variant of figure 2,
- figures 12, 13 are views according to arrows XII and XIII of figure 11,
- figure 14 is a diagrammatic side elevational view of a further variant,
- figure 15 is a partial elevational back view according to arrow XV of figure 14,
- figures 16-19 show another embodiment, and
- figures 20-22 show a variant of the embodiment of figures 16-19.

Referring to figures 1-4, numeral 1 generally designates a child seat comprising a backrest 2 from which there project rearwardly two cylindrical bolts 3, each of which is for cooperation with a receiver element 4, which will be described more in detail in the following, with which it constitutes a quick coupling.

With reference in particular to figure 2, numeral 5 generally designates a motor-vehicle seat, for example a rear seat, comprising a cushion 6 and a backrest 7 provided with a metal frame 8. Each cylindrical bolt has one end 9 rigidly connected to the structure of the child seat 1, and is adapted to be received in a bush 10, forming part of said receiver element 4, which is inserted in a hole 11 formed through the backrest 7. Each bolt 3 has, adjacent to its end nose 3a, a narrowed neck 3b with engages the narrow portion of an aperture 12 having the shape of a keyhole formed in a plate latch 13. Latch 13 is slidably mounted between two plates 14, 15 fixed to frame 8 of the backrest of the seat of the motor-vehicle by screws 16. It is moveable in a direction transverse to the axis of the bolt 3 and is biased by a helical spring 17 towards the position shown in figure 4, in which the narrowed neck engages the narrow portion of aperture 12, so that bolt 3 is axially locked within bush 10, since the end nose 3a can not be extracted from aperture 12. The end of the plate latch 13 opposite to spring 17 is provided with a push-bottom 18 which can be operated manually for moving latch 13, against the action of spring 17 towards a position in which the longer portion of aperture 12 is arranged coaxially with the narrow neck 3b, so that the end nose 3a is free to be withdrawn from ap-

erture 12.

In order to connect the child seat 1 to the motor-vehicle seat 5, it is sufficient to operate push-bottom 18 so as to arrange the latches 13 in the opened position, in which bolts 3 can be received fully within bushes 10, whereupon push-bottoms 18 may be realised, so that each spring 17 brings the respective latch 13 to its position for locking the corresponding bolt 3. In order to dismantle the child seat, it is sufficient to operate inversely, by pushing push-bottom 18 so as to bring latches 13 to their release positions.

In the embodiment shown in figures 5 through 8, parts corresponding to those of figures 1-4 are indicated by the same reference numerals. In this case, the main difference with respect to the solution of figures 1-4 lies in that each locking bolt 3 is fixed to the backrest of the motor-vehicle seat, whereas the corresponding receiver element 4 is provided on the child seat 1. More in detail, in this case, in the structure of the backrest of the child seat 1 there are slidably mounted two latch plates 13 which project on both sides of seat 1 with ends provided with push bottoms 18. Also in this case, each plate 13 has an aperture 12 shaped as a keyhole with a narrow portion which is able to engage a narrow neck 3b preventing withdrawal of the end nose 3a. The opposite end of each bolt 3 is welded to a plate 19 fixed by screws 16 to frame 8 of the backrest 7 of the motor-vehicle seat 5. In these embodiments, each bolt 3 projects forwardly from backrest 7 and engages a hole 20 formed in the backrest of the child seat 1. When the child seat 1 is not mounted, bolts 3 would project from the front surface of backrest 7 disturbing thereby the occupants. To avoid this inconvenience, each bolt 3 is articulated around an intermediate axis 21, so that an end portion 22 thereof may be rotated by 90° with respect to the axis of bolt 3 (to the position indicated by dotted line in figures 6 and 8) where it is arranged inside a seat 23 formed in the front surface of the backrest 7 and is held by a fork element 24.

The variant shown in figures 9, 10 relates to the case in which each quick coupling is of the type known per se normally used for safety belts. More precisely, each quick coupling has a tab 30 which is welded to frame 7 of the backrest of the motor-vehicle seat and projects in a seat 31 formed forwardly thereto said tab being adapted to be snap received into a receiver element 32 of the type of a buckle of a safety belt which is fixed at the rear of the child seat 1. The inside structure of receiver element 32 is not illustrated herein in detail, since, as already indicated, it may be of the known type conventionally used for safety belts. This buckle may be, according to the conventional technique adopted in this field, provided with a device for releasing tab 30, which in this case can be operated remotely by a cable 33 ending with a driving lever 34 arranged on one side of the child seat 1.

Figures 11-13 show a variant in which buckle 32 is also arranged at the rear of the child seat 1, but with its receiving aperture facing downwardly, whereas tab 30 is

fixed to frame 7 by bolts 33 and projects through the space between cushion 6 and backrest 7, with an end portion 30 directed upwardly.

According to the variant shown in figures 14 and 15, in addition to the pair of quick couplings 30-32 similar to those already described with reference to figures 9 and 10 (or also of a different type, although with quick coupling and uncoupling) there is provided a further quick coupling unit between the top of backrest 2 of the child seat 1 and the backrest 7 of the motor-vehicle seat 5. This unit comprises a pair (as in the case of the illustrated example) or also two pairs of quick coupling members, one constituted by a receiver element 32a of the type of a buckle for safety belts, carried by the back of backrest 7 of seat 5 adjacent to its stop, and the other being constituted by a tab 30a which can be snap engaged within a buckle 32a and anchored to the end of a belt 34. This belt 34, of the type conventionally used for safety belts, is fixed at its other end to the top of backrest 2 of the child seat 1.

In the condition of engagement between tab 30a and buckle 32a, belt 34 is normally under tension.

Figures 16-19 show another embodiment in which two engagement members 50 in form of U-shaped brackets are fixed to a cross-member 51 of sheet-metal forming part of the frame 8 of the backrest by nuts 52 screwed onto threaded end portions 53 of brackets 50. Brackets 50 project forwardly through apertures provided in the backrest padding and are covered by plastic caps 54 with apertures 55 to allow receiver elements of any type provided on the child seat to reach the engagement elements 50. The receiver elements for example may have the structure of a latch mechanism of the conventional type used in motor-vehicle doors. Cross-member 8 on its turn is fixed by bolts 56a to U-shaped brackets 56 which are pivotally mounted within brackets 57 fixed to the motor-vehicle body, to allow tilting of the rear seat backrest.

Figures 20-22 show a variant of the embodiment of figures 16-19, which can be used in case the device according to the invention has to be adapted on a motor-vehicle originally produced without such a device.

The main difference with respect to the embodiment of figures 16-19 is that in this case both U-shaped brackets 50 are carried by a common plate 58 which is fixed by bolts 59 to cross-member 8.

Naturally, while the principle of the invention remains the same, the details of construction and the embodiment may widely vary with respect to what has been described and illustrated purely by way of example, without departing from the scope of the present invention.

## Claims

1. Device for quick coupling of a child seat (1) to a motor-vehicle seat (5), characterized in that it comprises at least two quick couplings (3, 4) each com-

prising a receiver element (4) and an element (3) for engaging the receiver element (4) carried by the child seat (1) and the frame (8) of the backrest (7) of the motor-vehicle seat (5) respectively, or vice versa, and releasable locking means (13, 32), for locking each engaging element (3) within the corresponding receiver element (4).

2. Device according to claim 1, characterized in that each engaging element (3) is constituted by a bolt projecting rearwardly from the backrest of the child seat (1), said receiver element (4) being comprised of a bush (10) inserted within a hole (11) formed through the backrest (7) of the motor-vehicle seat (5) and said locking means is constituted by a latch (13) slidable within said frame (8) of the backrest (7) in a direction transverse to the axis of said bolt (3) said latch (13) being biased by spring means (17) towards a position for locking said bolt (3) and being manually moveable, against the action of said spring means (17), towards a position for releasing said bolt (3).
3. Device according to claim 1, characterized in that each engaging element (3) is constituted by a bolt projecting forwardly from the backrest (7) of the motor-vehicle seat (5) and said receiver element (4) is constituted by a hole (20) formed through the backrest of the child seat (1); said locking means being comprised of a latch (13) which is slidable within the backrest of the child seat (1) in a direction transverse to the axis of said hole (20), and is biased by spring means (17) towards a position for locking said bolt (3) and is manually moveable, against the action of said spring means (17) towards a position for releasing said bolt (3), the latter having an articulated end portion (22) which is moveable to a position rotated by 90° with respect to the axis of bolt (3) to be received within a corresponding seat (23) formed in the front surface of backrest (7) of the motor-vehicle seat (5), when the child seat (1) is not connected to said backrest (7).
4. Device according to claim 1, characterized in that each quick coupling is a coupling of the type known per se used for safety belts, in which the engaging element is a tab (30) and the receiver element is a buckle for safety belts (32).
5. Device according to claim 4, characterized in that the buckle (32) projects rearwardly from the child seat (1) and the tab (30) is fixed to the frame (8) of the backrest (7) of the motor-vehicle seat and projects forwardly from a hole formed through said backrest (7).
6. Device according to claim 4, characterized in that the buckle (32) is arranged at the rear of the child

seat (1) with its receiving aperture facing downwardly and the tab (30) is fixed to the frame (8) of the backrest (7) of the motor-vehicle seat (5) and projects forwardly from the gap between the cushion (6) and the backrest (7) of the motor-vehicle seat (5), and has an end portion (30a) directed upwardly.

7. Device according to claim 4, characterized in that the buckle (32a) is carried at the rear of the backrest (7) of the motor-vehicle seat (5), adjacent to the top thereof, and the tab (30a) is connected to a belt (34) of a type for safety belts, anchored to the top portion of the backrest (2) of the child seat (1).
8. Device according to claim 1, characterized in that said engagement element is a U-shaped bracket (50) fixed to a cross-member (58) forming part of the frame (8) of the backrest (7) of the seat (5).

20

25

30

35

40

45

50

55

Fig. 1

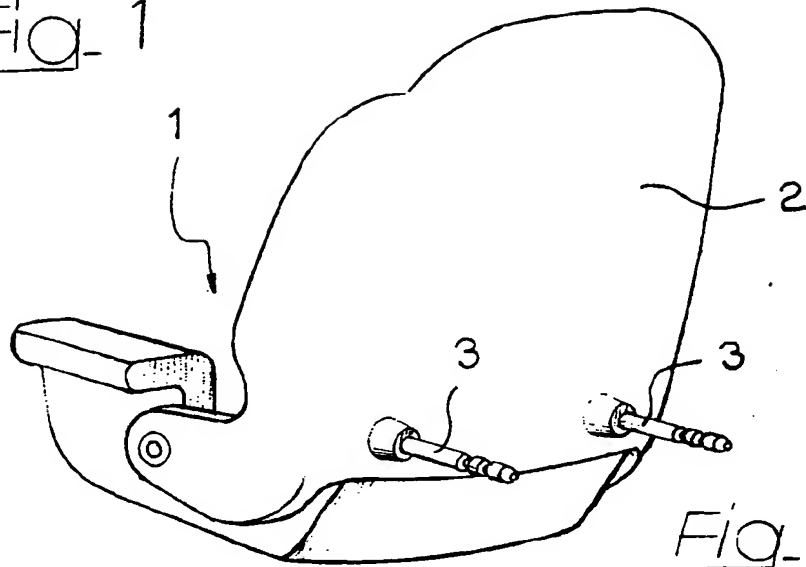


Fig. 2

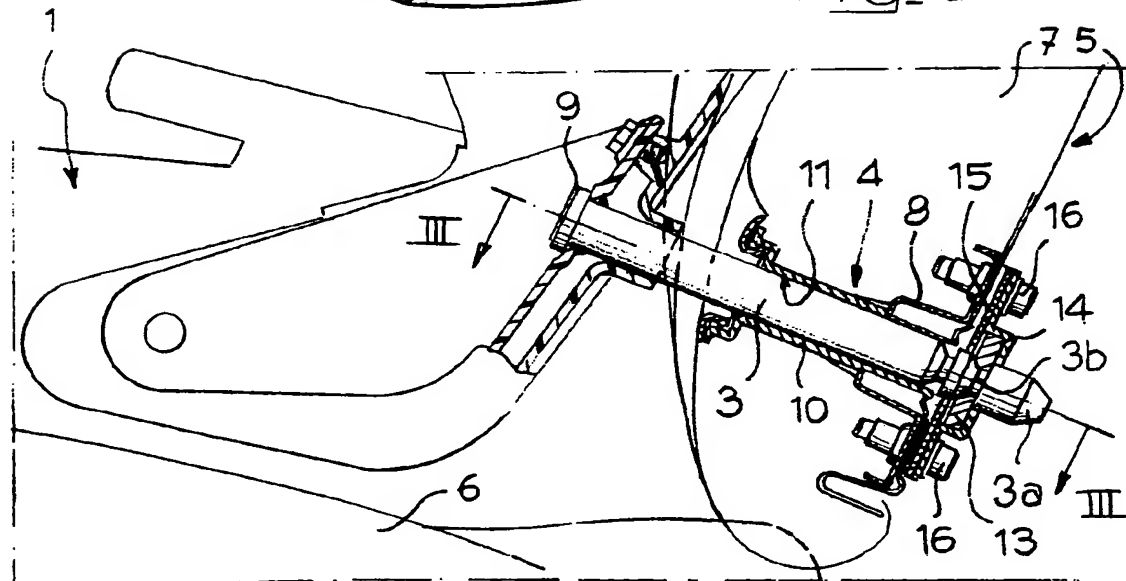


Fig. 3

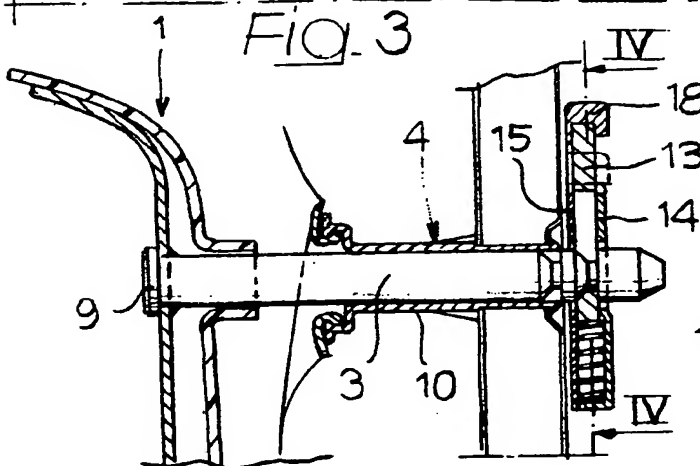


Fig. 4

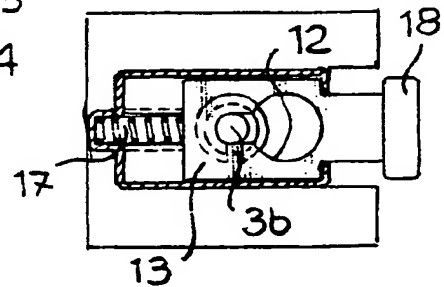


Fig. 6

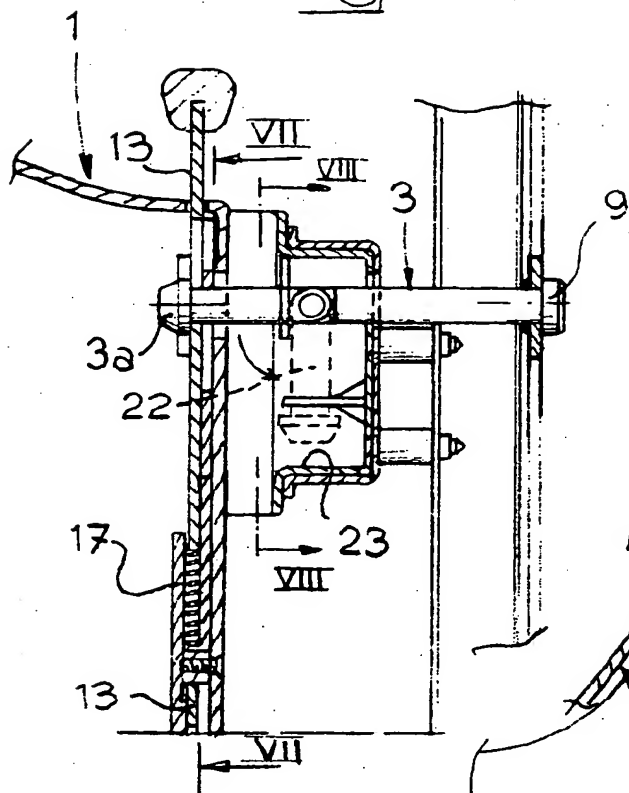


Fig. 5

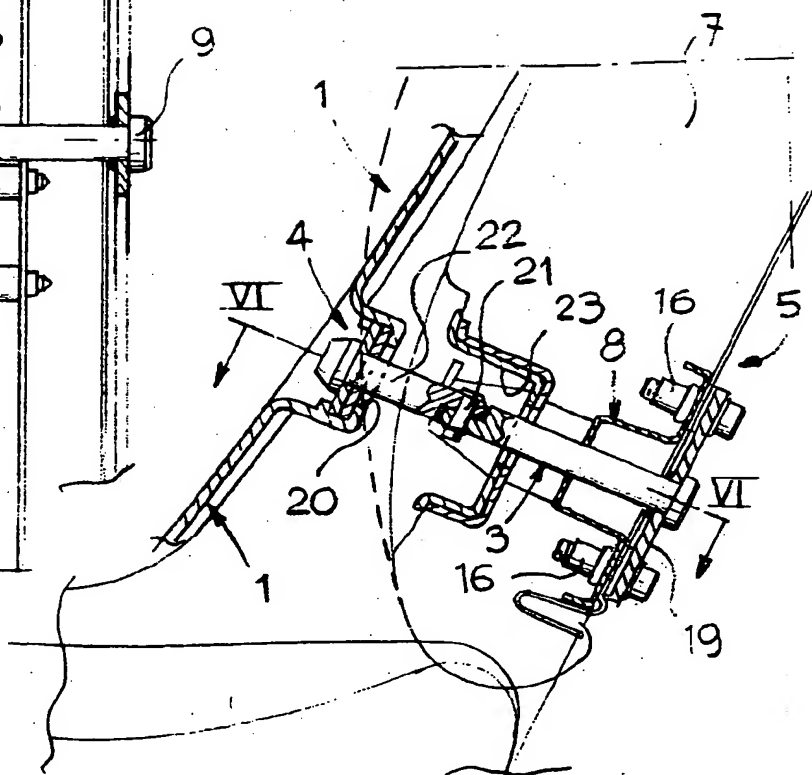


Fig. 8

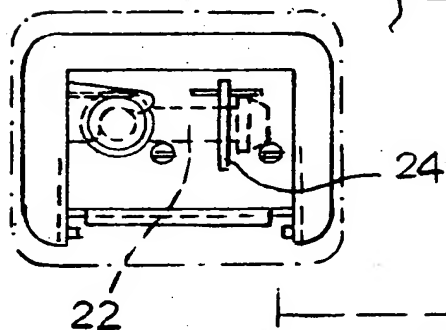
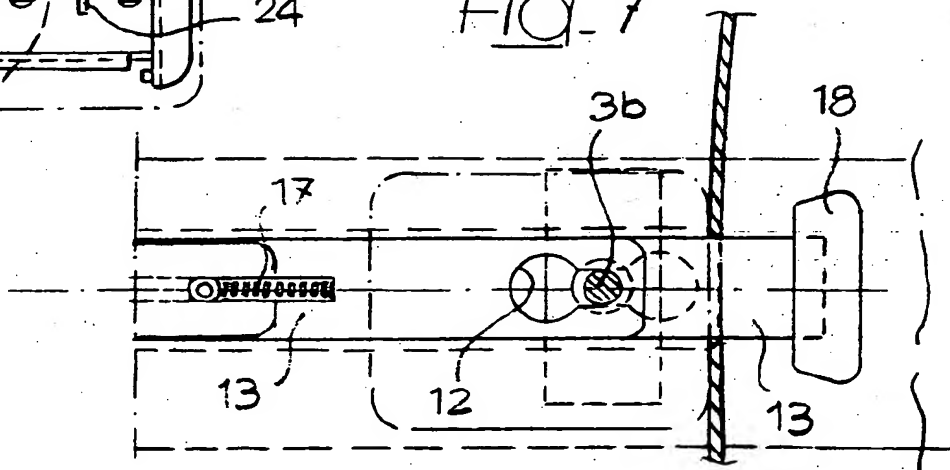


Fig. 7



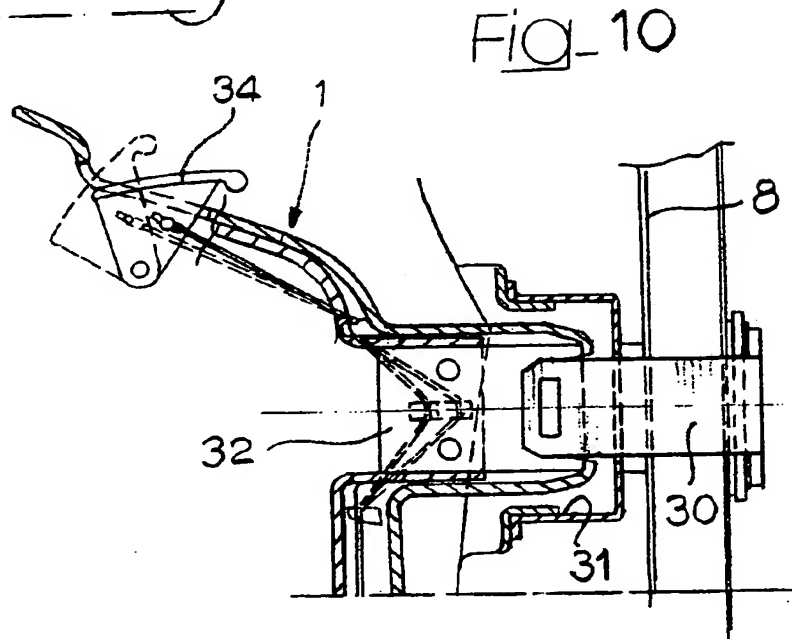
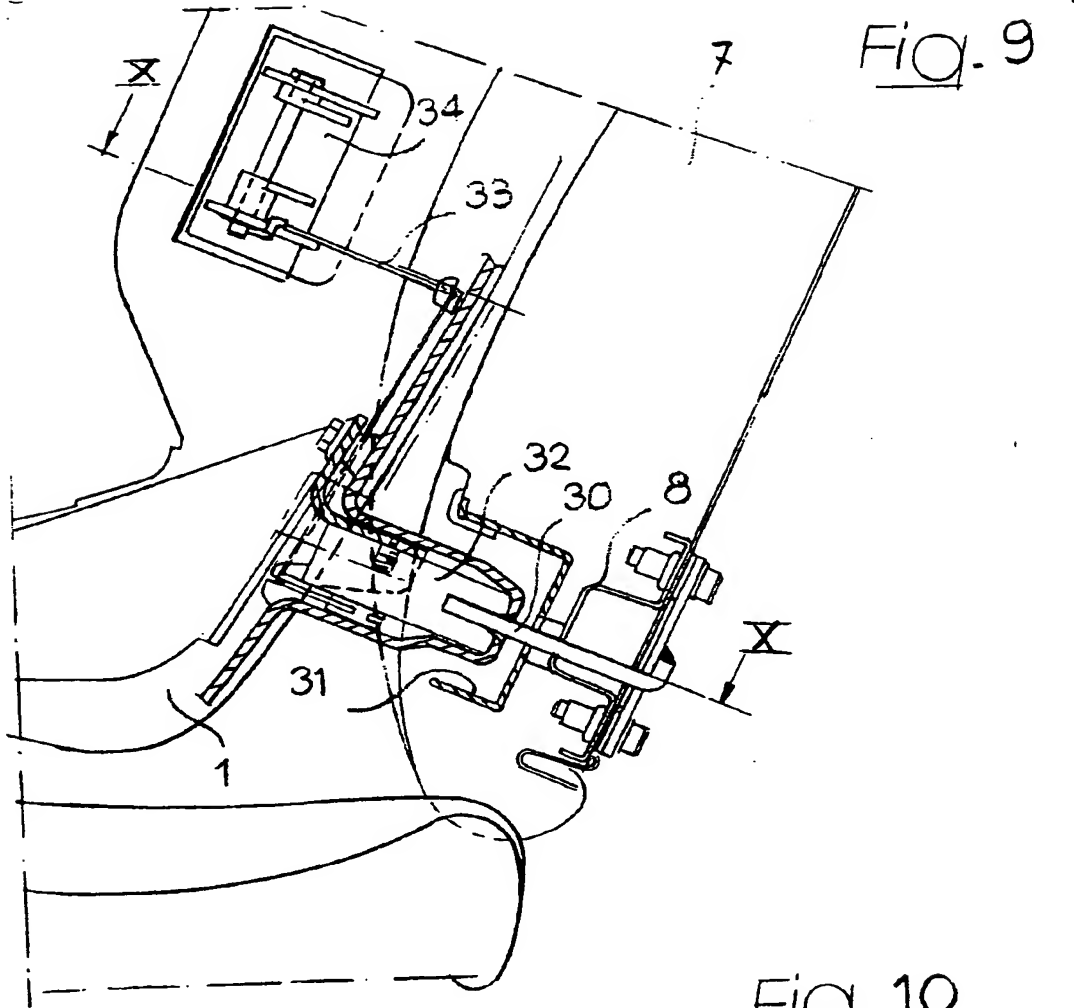




Fig. 11

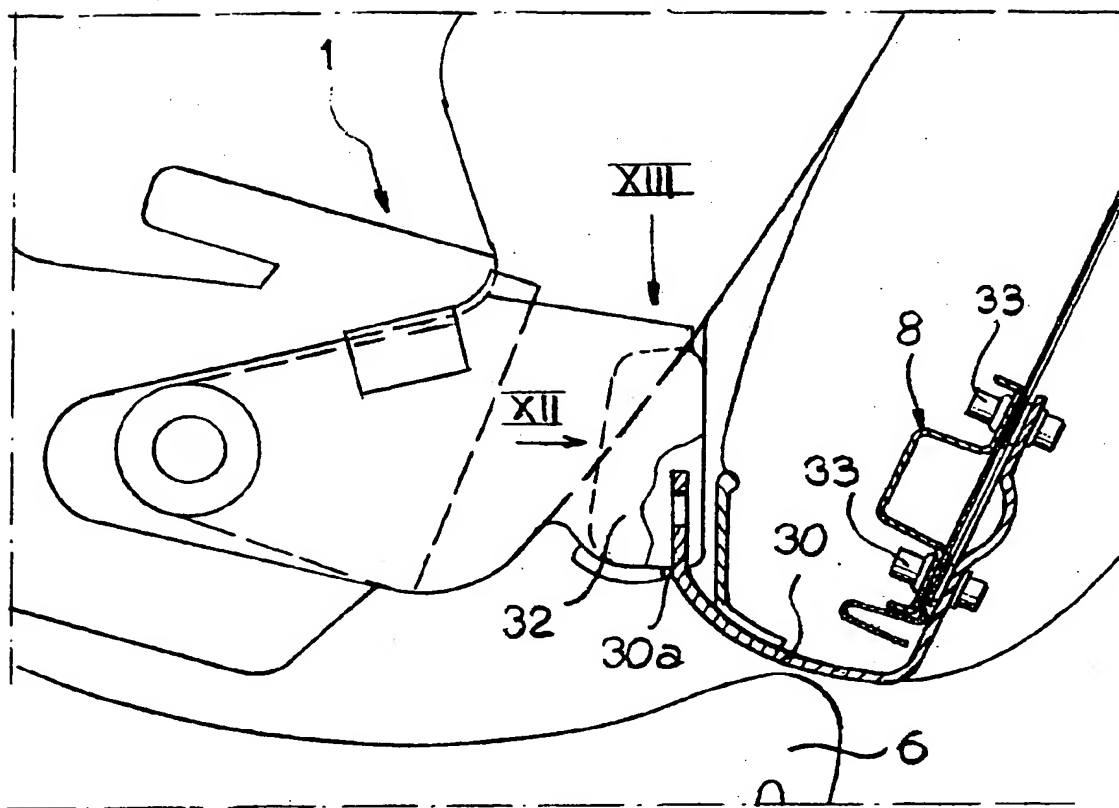


Fig. 12

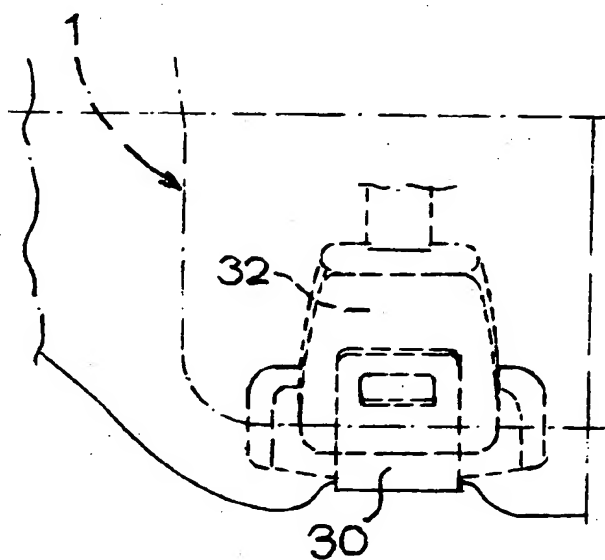
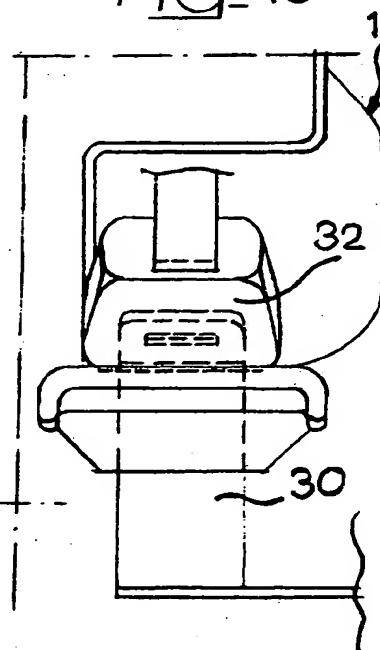


Fig. 13



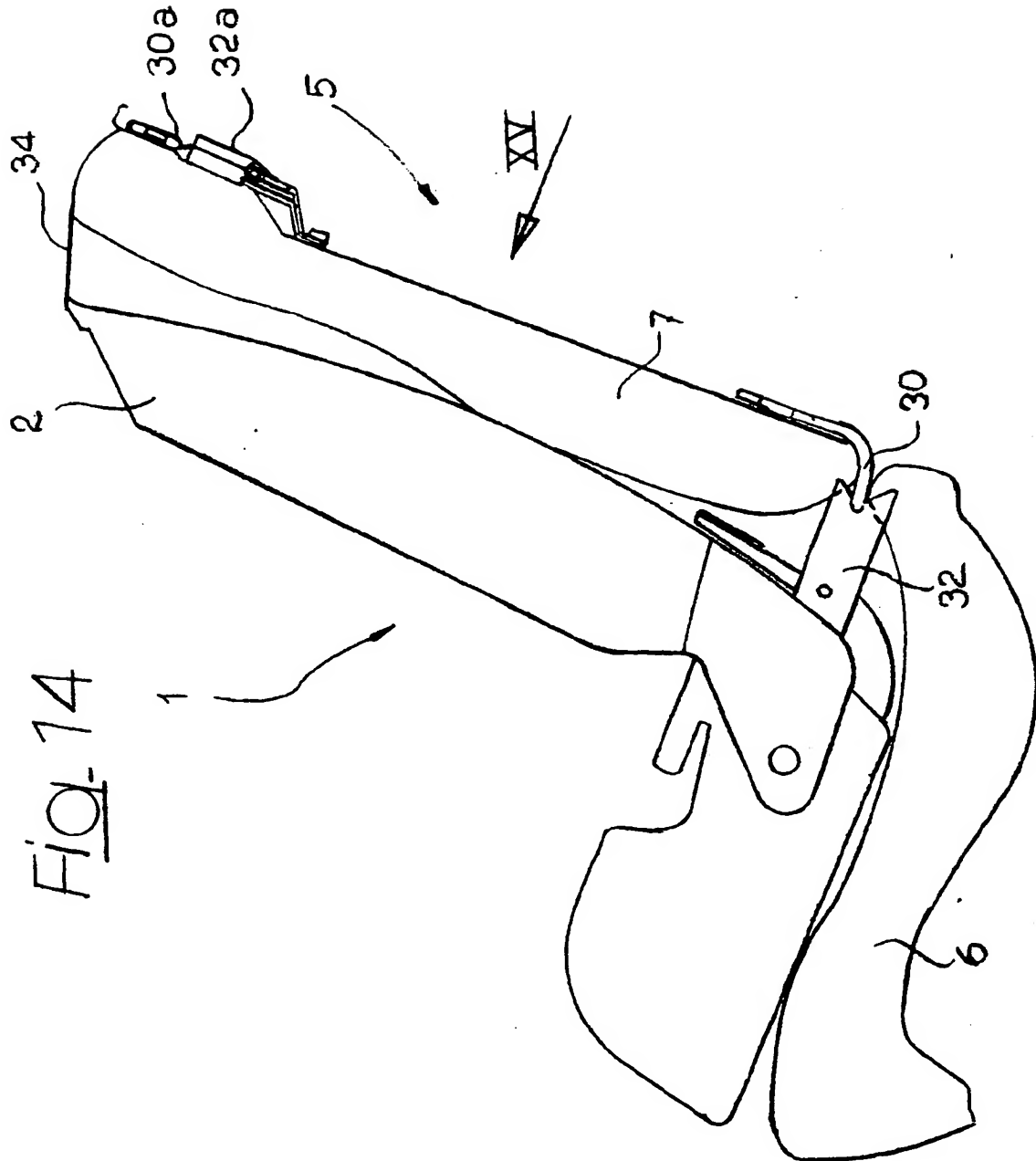


Fig. 15

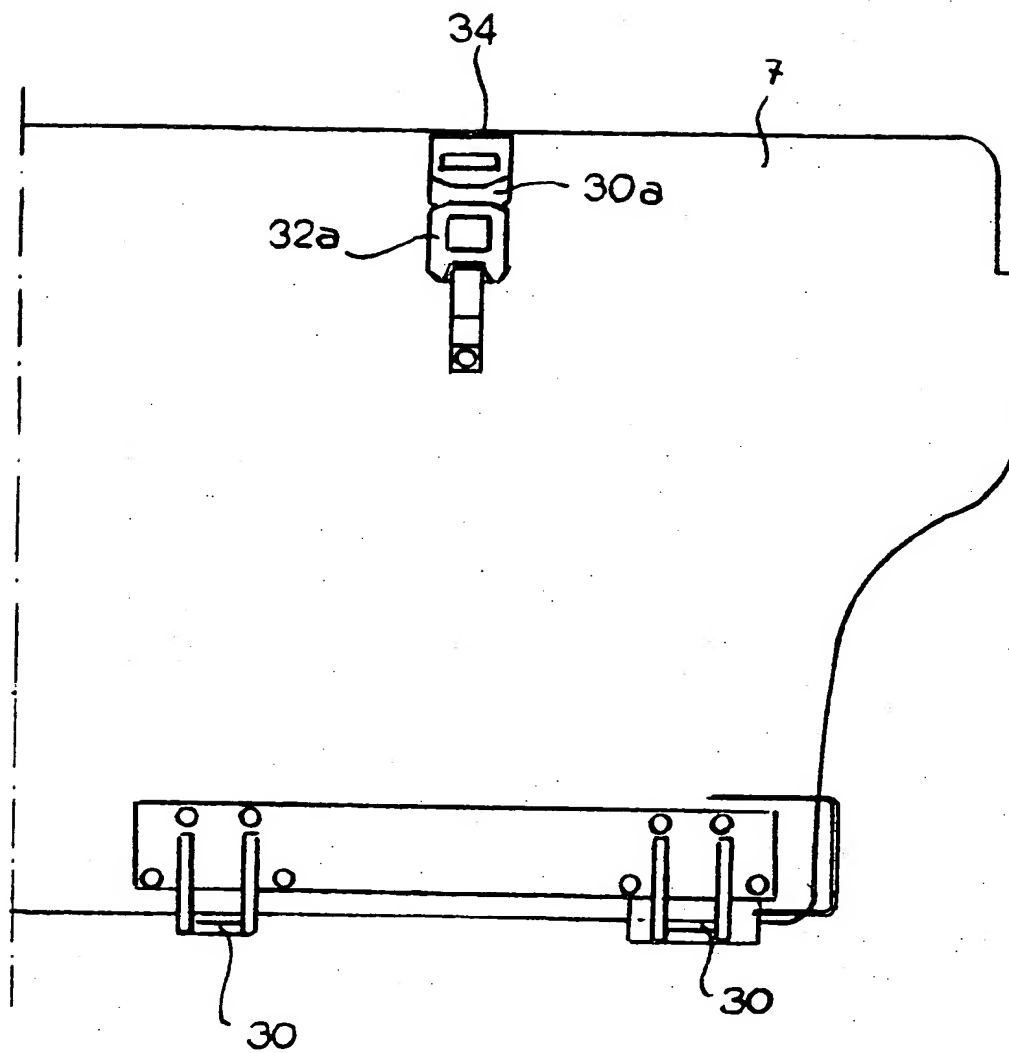


Fig. 16

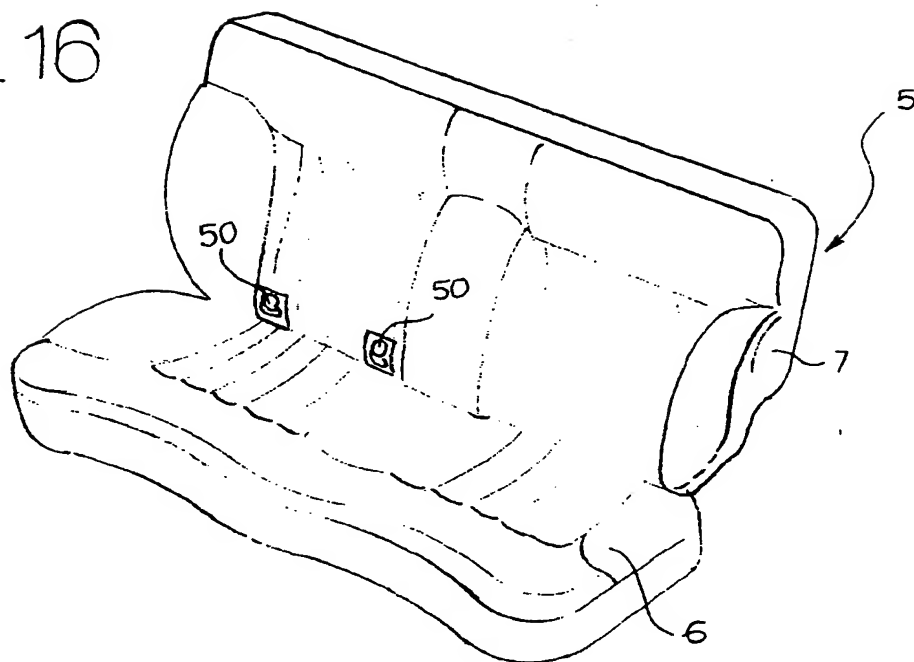


Fig. 17

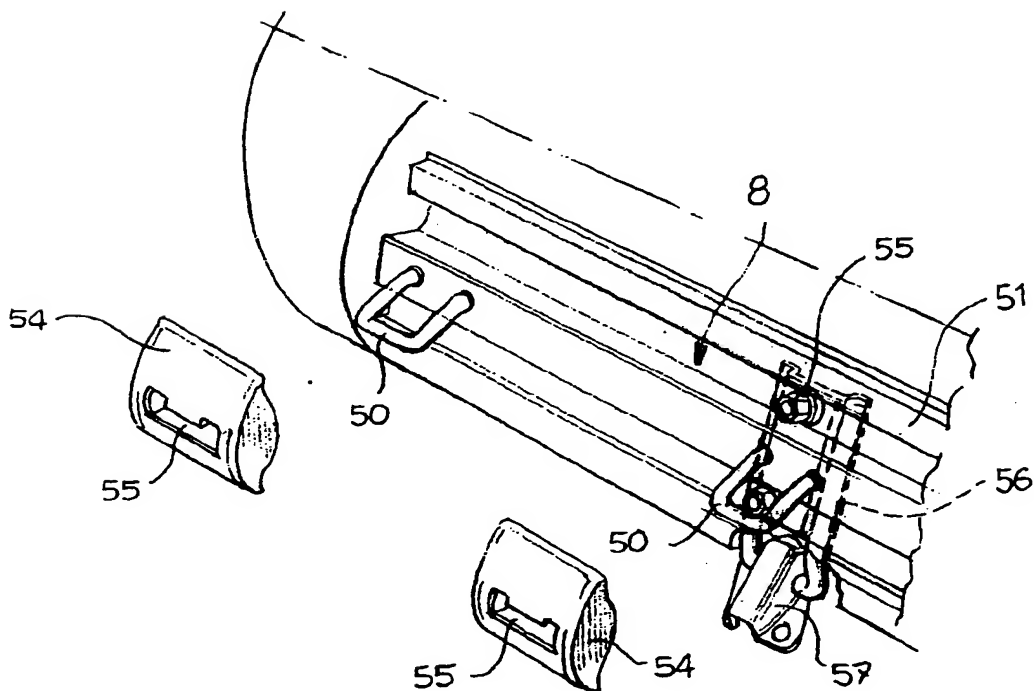


Fig. 18

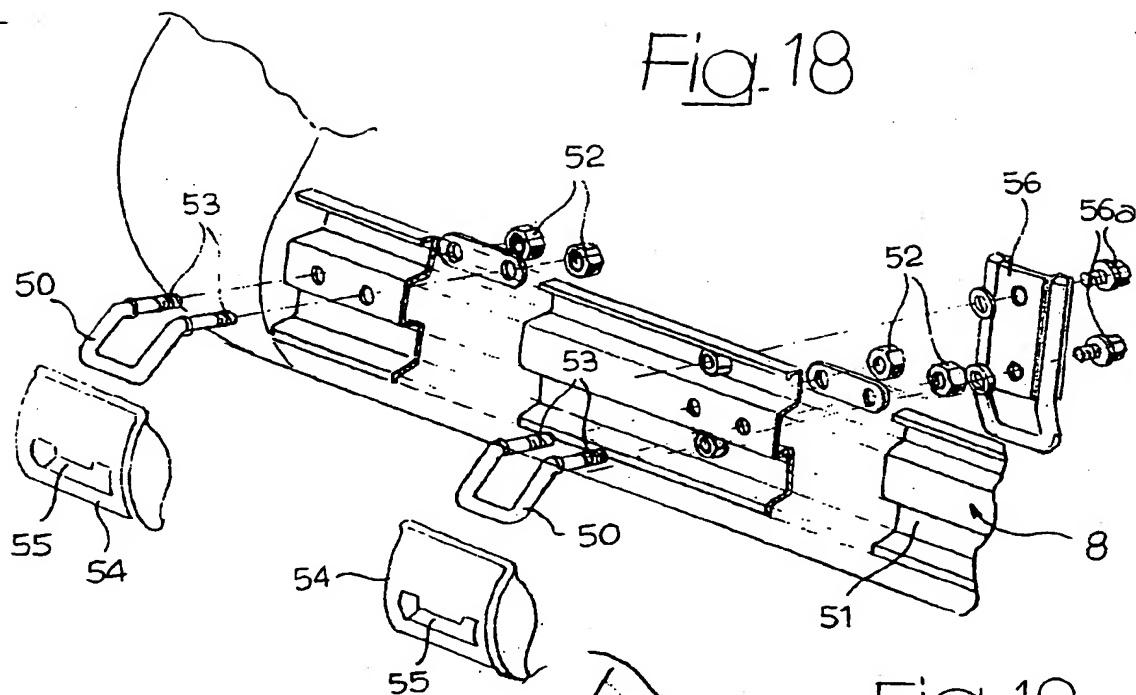


Fig. 19

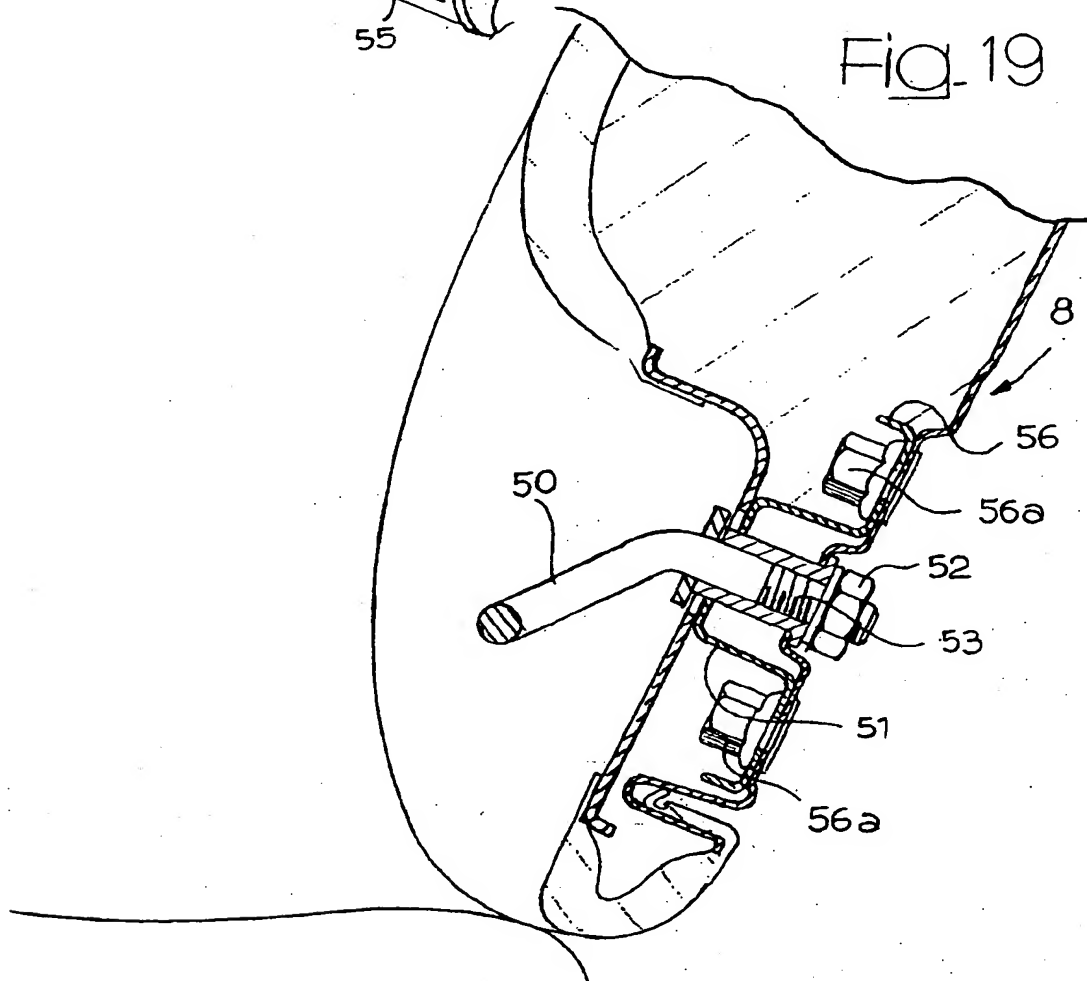


Fig. 21

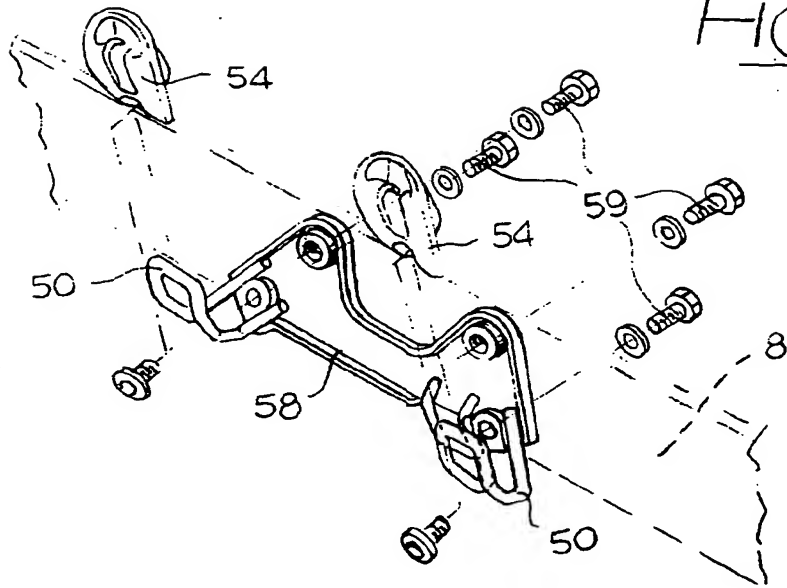


Fig. 20

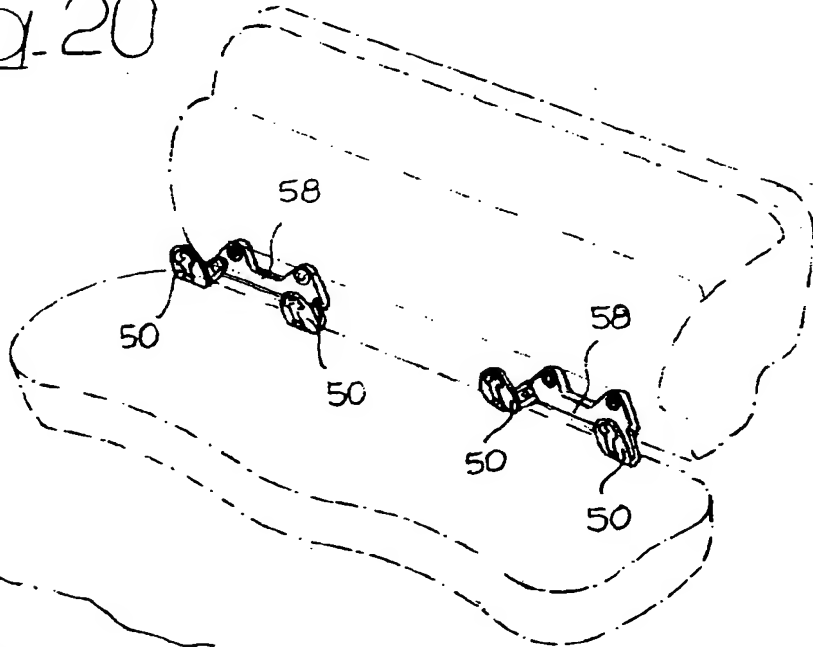
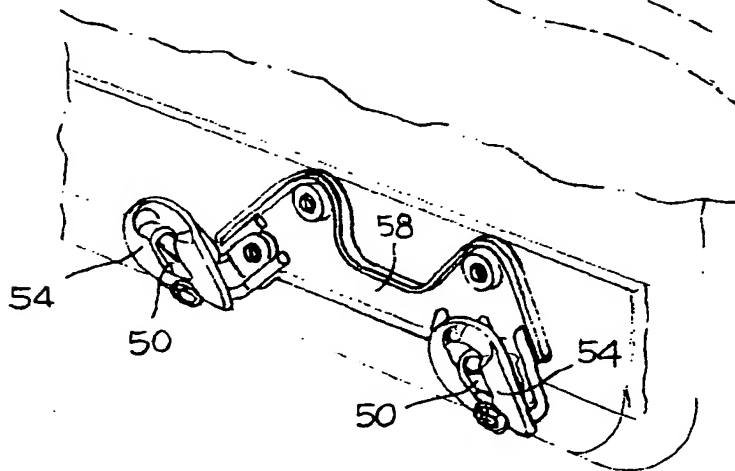


Fig. 22





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 95 83 0310

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D,X A	FR-A-2 680 734 (BABY RELAX SNC) * page 3, line 14 - page 4, line 36; figures 1-5 * ---	1 2	B60N2/28
D,X A	DE-U-92 08 438 (CURT WÜRSTL VERMÖGENSVERWALTUNGS GMBH & CO. KG) * page 8, line 22 - page 11, line 3; figure 1 * ---	1 2	
A	DE-C-42 04 224 (CURT WÜRSTL VERMÖGENSVERWALTUNGS GMBH & CO. KG) ---		
A	DE-C-41 25 959 (DEUTSCHE AIRBUS GMBH) -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B60N
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 5 October 1995	Examiner Horvath, R
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons A : member of the same patent family, corresponding document</p>			

EPO FORM 1501 (01.92) (P04/C01)

**This Page Blank (uspto)**



**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**

This Page Blank (uspto)